767 Postnatal Ozone Exposure Enhances House Dust Mite Induced Airway Hyperresponsiveness Without Increasing Inflammation

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RATIONALE: Ozone is a common urban air pollutant. Children are particularly vulnerable to developing adverse respiratory health effects from ozone exposure. Ozone can cause tissue damage and may play a role in sensitization to allergens. We examined the effect of postnatal ozone exposure on the development of house dust mite (HDM) induced allergic airway disease in newborn mice.

METHODS: Newborn BALB/c mice (2-4 days old) were exposed to ozone (1000 ppb) or filtered air (FA) for 3 hrs followed 6 hrs later by intranasal challenge with HDM; the latter was repeated 3 times a week for 3 consecutive weeks. Lung dendritic cells (DC) were isolated 24 hrs after the first HDM challenge to examine their phenotype and accessory function. Airway responses were assessed 24hrs after the last HDM exposure. Airway inflammation was examined by measuring cytokine levels and by enumerating inflammatory cell types recovered in the BAL fluid. Airway function was assessed by invasive method, measuring changes in lung resistance in response to increasing doses of inhaled methacholine.

RESULTS: Postnatal ozone exposure did not alter lung DC phenotypes or expression of DC accessory molecules (MHC-II, CD80, CD86, and OX40L). Airway inflammation indicated by levels of IL-4, IL-5 and IL-13 in the BAL, HDM specific serum antibody levels and production of cytokines by restimulated lymphocytes was unaffected by ozone exposure. However, compared to FA, postnatal ozone significantly enhanced HDM induced airway sensitivity to methacholine.

CONCLUSIONS: Postnatal ozone increases airway sensitivity to methacholine induced by HDM allergen challenge without increasing allergic sensitization.

768 Frequent Allergy Symptoms Among Children Living Near The World Trade Center Associated With Elevated Peripheral Airways Resistance

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RATIONALE: After the World Trade Center disaster: 1) neighborhood children with pre-existing asthma were worse; 2) new cases of asthma increased by 50% and 3) spirometric obstruction rates remained high. Atopy, small airways narrowing, and subsequent air pollution (PM2.5) composition have not been studied.

METHODS: Redline Allergy/Asthma Questionnaires were distributed to students at the closest ethnically homogeneous school near Ground Zero, we conducted Jaeger MasterScreen Impulse Oscillometrymand analyzed emissions data from air quality samplers (Federal Reference Method and TEOM) speciated for metals.

RESULTS: Among 158 completed surveys, *p*-values of <0.001 were found when correlating child and parent responses. to answering "yes" for: wheezing, dyspnea, coughing, chest tightness, nocturnal awakening, coughing with stair climbing, itchy eyes, runny nose, doctor/nurse diagnosis of asthma, use of asthma or allergy medications. No subjects reported hospital admissions. Mean R5, X5 and R20 (resistance at 5 Hz, reactance at 5 Hz, and resistance at 20 Hz, respectively) were high. Boys values were R5=7.2, X5=-2, and R20=3; Girls values were R5=6.7, X5=-2.7, R20=3.2. Mean values for the entire group of boys and girls were: R5=6.99, X5=-2.75, R20=3.35. Emission exposure fluctuated above EPA safety levels (35μg/m3). Chromium, Mercury, Magnesium, Nitrate, Vanadium, indium and lead were detectable.

CONCLUSIONS: This is the first report of elevated pediatric allergy symptoms near the World Trade Center. Poorly-controlled allergic asthma indicates persistent unmet medical need.

High values of airway resistance at 5 Hz, suggest small airways dysfunction. Particulate matter air pollution–vanadium, indium and lead–may account for some respiratory symptoms.

769 Annual New York City Trends Of Ambient Fine Particulate Matter, Black Carbon And Ambient Metals Implicated In Airway Disease

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RATIONALE: Exposure to many traffic-related air pollutants triggers airway inflammation, asthma exacerbations and other respiratory illnesses. We hypothesized that the levels of air pollutants in New York City (NYC) decreased following multiple legislations regulating vehicular and other emissions.

METHODS: NY State Ambient Air Monitoring Program validated datasets (1999-2010) concerning fine particulate matter ($PM_{2.5}$), elemental carbon (EC), a product of incomplete combustion from vehicles and home heating, and various metals at Intermediate School (I.S.) 52 in the Bronx were obtained and annual trends analyzed by a linear regression model. Additional $PM_{2.5}$ levels were measured at Morrisania site in the Bronx and analyzed.

RESULTS: $PM_{2.5}$ levels significantly decreased at both sites over the past twelve years (b=-0.036 and -0.032 for I.S.52 and Morrisania, respectively, p<0.001). A similar pattern was observed for lead, nickel and vanadium (b= -0.101, -0.125, -0.079 respectively; p<0.001). A nonsignificant decrease was observed for sulfur and iron as well. Unexpectedly, a significant increase was observed for EC (b=0.084, p<0.001), copper (b=0.058, p<0.001), and zinc (b=0.030, p<0.001). Annual trends of $PM_{2.5}$, EC, and the measured metals remained the same even after controlling for heating season.

CONCLUSIONS: Ambient levels of $PM_{2.5}$ and certain metals (lead, nickel, vanadium) decreased in NYC over the past twelve years, while EC, copper and zinc increased. The diverging trends of air pollutants (EC vs. nickel and vanadium) that share common polluting sources (vehicular emissions, residential heating oil), suggest that other sources also play an important role in ambient levels of these pollutants, and merit identification and study.

770 Relationship Between Environmental Phenols And Aeroallergen And Food Allergies In The US: Results From The National Health And Nutrition Examination Survey 2005-2006

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RATIONALE: Previous research supports a possible link between environmental pollution and allergic conditions. Vitamin D deficiency has been associated with higher levels of allergic sensitization in children and adolescents. We hypothesized that exposure to environmental phenols is associated with an increased risk of sensitization to food and aeroallergens, and that the association of phenol exposure with allergies would differ among people with low versus normal levels of vitamin D.

METHODS: Data was extracted from 2548 participants in the National Health and Nutrition Examination Survey 2005-2006. Phenolic compound levels were measured in urine. Food and aeroallergen specific IgE levels were measured in serum. A sample weight adjusted chi-square test was used to determine the association between phenol exposure and the sensitization to food or aeroallergens. Adjustment was made for vitamin D levels (<30 ng/ml and ≥30 ng/ml).

RESULTS: Exposure to 1 or more phenols was associated with the presence of food allergy if vitamin D level was <30 ng/ml (OR=1.8, 95% CI (1.6; 1.96), p<0.001). There was no significant association between phenol exposure and increased aeroallegen-specific serum IgE levels.

CONCLUSIONS: Exposure to environmental phenols is associated with the presence of food allergies in individuals with low levels of vitamin D. There was no significant association between phenol exposure and food allergies in individuals with normal vitamin D levels.

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